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NOTE.—Since the foregoing paper was written I have learned, through the courtesy of Dr. Stejneger, that Mr. Frank H. Nutter contributed an account of the Bittern's pumping to the 'Oölogist's Exchange' for April, 1888 (Vol. I, No. 4). I subjoin it in full.

"By the way, did you ever see a Bittern while engaged in its serenade? It is a ludicrous performance. One favored me with it once within easy range of my telescope. After standing in a meditative position for some time it would slowly raise its head and stretch up its neck till its bill pointed nearly straight upwards, when it commenced by several times opening and shutting its big beak with a snap that was plainly heard, though five or six hundred feet distant; it then uttered the characteristic notes from which it takes its common name of 'stake-driver' or 'thunder-pumper'; and truly it seems much like pumping, for each syllable seems to originate deep in the interior of the bird and to be ejected only with the greatest muscular exertion, puffing out its feathers and working its long neck up and down, as if choking to death. After a short season of meditation to recuperate its strength, the performance is again repeated, and doubtless to its mate, engaged in her maternal duties, it is the sweetest of music."

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## THE MAIN DIVISIONS OF THE SWIFTS.

BY FREDERIC A. LUCAS.

SINCE Dr. Sclater's paper on the genera and species of Swift (P. Z. S., 1865, pp. 593-617) they have been allowed to remain in the two subfamilies, Cypselinæ and Chæturinæ, into which he there divides this group. Dr. Sclater's divisions are founded solely on external characters, and he is very careful to state that he has paid but little attention to the species of the genera *Collocalia* and *Dendrochelidon*. In a footnote Dr. Sclater refers to a paper by Dr. Bernstein (Acta Academiæ Leopoldino-Carolinæ, Vol. 26, p. 15) as showing conclusively that *Collocalia* is in every point of view strictly Cypseline, and most nearly allied to *Dendrochelidon*. While I have not read Dr. Bernstein's paper

it is impossible for me to coincide in his view of the relationship of *Collocalia*, although fully agreeing with him in regard to its being in every point strictly Cypseline. *Collocalia*, for whose skeleton I am indebted to my friend Mr. C. F. Adams, is a member of the Chæturine group of Swifts, and so nearly resembles in structure our common Chimney Swift that it would be difficult on structural grounds to separate them generically.

The members of the genus *Dendrochelidon* on the other hand stand by themselves among the Swifts, the characters separating them from their relatives, as represented by *Micropus apus*, *M. subfurcatus*, *Panyptila saxatilis*, *Chætura pelagica*, and *Collocalia fuciphaga* are well marked. An entire skeleton of *Dendrochelidon* is unfortunately not at hand, but Prof. Alfred Newton has most kindly loaned me a skull and sternum of *D. mystacea* and two sterna of *D. wallacei*, which with some wing and leg bones furnish an abundance of good differential characters.\* The skull alone would be quite sufficient to separate *Dendrochelidon* from the other Swifts and the other bones furnish strong corroborative testimony.

Viewing the cranium of *Dendrochelidon* from its dorsal aspect, the rostral portion is seen to be both narrower and longer than in either *Micropus*, *Panyptila*, *Chætura*, or *Collocalia*. The mass of the ecto-ethmoid, so prominent in other Swifts, does not project beyond the outline of the frontals. There is no lachrymal in any of the skulls of *Dendrochelidon* at my disposal, though this little bone is present in *Micropus subfurcatus* and *Collocalia fuciphaga*.

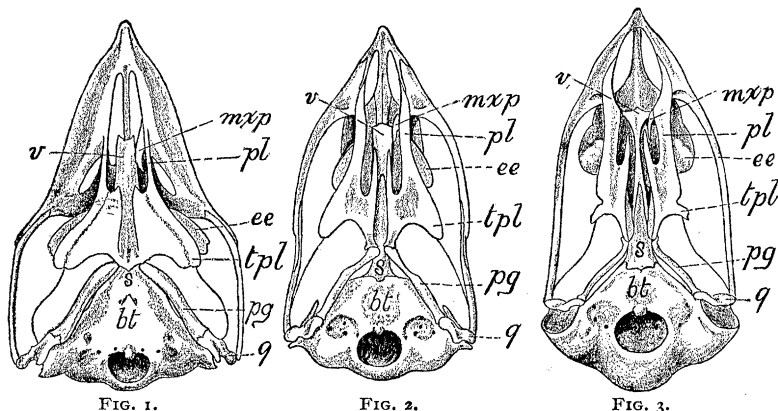
A decided structural difference exists between *Dendrochelidon* and the other Swifts in the frontal region from the fact that in *Dendrochelidon* the nasals are posteriorly narrow, and simply abut against the frontals, while in the other Swifts an external process of the wide nasals is carried upward and backward, overlying the frontals. In this respect the adult *Dendrochelidon* much resembles the younger stages of other Swifts, in which the external and internal processes of the nasal ossify first, forming a crescentic bar of bone bounding the nasal opening. Later on the ascending process ossifies, forming a tri-radiate bone, extremely well marked in *Panyptila*. The interorbital portion of the frontals

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\*See, however, foot-note on page 11.

is comparatively wide, slightly suggesting *Caprimulgus* in its outline. Viewed from below the elongation of the rostrum is very noticeable while the pre-maxillaries are seen to run well backward, thus contrasting with the other Swifts and once more suggesting *Caprimulgus*.

*Dendrochelidon* has the characteristic unciform maxillo-palatines of the Swifts, but the palatines and vomer differ totally from the Cypseline pattern. The pre-palatine bar is narrow, instead of wide, the external palatine notch is wanting, and the trans-palatine portion is entirely different in shape from that of the other Swifts, being not unlike *Caprimulgus*. The anteriorly T-shaped vomer of the other Swifts is replaced by a vomer that is scarcely expanded at all distally.



Ventral aspect of crania of 1. *Antrostomus vociferus*, 2. *Dendrochelidon mystacea*, 3. *Chaturap pelagica*, all enlarged to the same absolute size.

v, vomer; mxp, maxillo-palatine; pl, prepalatine; ee, ecto-ethmoid; tpl, trans-palatine; pg, pterygoid; q, quadrate; s, sphenoid; bt, basi-temporal.

One maxillo-palatine is omitted to better show the vomer.

Owing to foreshortening the length of the rostral portion of the skull of *Dendrochelidon* is apparently not so great as it is in reality.

The sphenoid of *Dendrochelidon* partakes of the general elongation of the skull, and the articulations of the pterygoids with the sphenoid are brought well forward, and form a rather sharp angle with one another. This is a departure from the Cypseline structure, in which the pterygoids are closely applied to the basi-temporal, and a step toward the Passerine arrangement.

While retaining the general characters of the Swifts, the shoulder girdle of *Dendrochelidon* departs widely from the typical Cypseline pattern. The xiphoid margin of the sternum instead of being convex is slightly concave, and instead of being imperforate presents on either side a subtriangular fenestra occupying the place of the notch found in Passerine birds. These fenestræ are not to be confounded with the sternal vacuities so constantly found in the Swifts, for large, irregular fenestræ are present in the body of the sternum; but the marginal fenestræ are such as would be formed were the external xiphoid process of a Passerine bird united with the body of the sternum by a bar of bone. The outline of the carina is more convex than in any of the other Swifts, and recalls the Caprimulgine sternum.

The coracoid is moderately long, much longer than in any of the allied forms, its length, in comparison with the total length of the sternum, being  $\frac{67}{100}$  in *D. wallacei*, and  $\frac{72}{100}$  in *D. mystacea*, while in *Micropus apus* it is  $\frac{52}{100}$ , in *Collocalia fuciphaga*  $\frac{52}{100}$ , and in *Chatura pelagica*  $\frac{50}{100}$ . The furcula is also longer and the hypocleidium better developed than in other Swifts, the furcula resting upon the anterior edge of the carina. The scapula is more decurved than in any other Swift except *Collocalia*, but experience with other forms shows that the scapula has but slight taxonomic value.

Unfortunately there is no humerus among the bones in my possession, but from the proportions of the other bones of the wing it would not be surprising if the humerus should prove to be longer and less strongly marked than the usual Cypseline pattern.\* The radius and ulna, instead of being considerably shorter than the second metacarpal, are considerably longer, while they are also more concave toward one another than in other Swifts. The

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\*Since the above was written, Dr. W. K. Parker has very kindly sent me for examination a skeleton of *D. coronata*. This corresponds in the respective portions of its skeleton with the species already examined, while the humerus proves to be as surmised, much more slender and much less rugose than in the other Swifts.

The differences of proportional length between the wing bones of *Micropus apus* and *Dendrochelidon mystacea* can be well expressed in figures by calling the length of the metacarpals 100.

They are as follows:

	<i>M. apus.</i>	<i>D. mystacea.</i>	<i>Chatura.</i>	<i>Collocalia.</i>
Metacarpals	100	100	100	100
Radius	76	110	75	88
Humerus	56	95	60	63

'tarsus' is much shorter and wider in *Dendrochelidon* than in any of its relatives, and the anterior and posterior surfaces instead of being deeply grooved for the reception of tendons are decidedly convex. The first metatarsal is well developed and is placed well up on the 'tarsus,' the unguis phalanges are not of the regular Cypseline pattern, and the phalanges, within the penultimate, instead of being short or obsolete are moderately long. Finally the 'tarsus' is shorter than even the first digit, while in all other Swifts it is longer, notably so in *Chætura*.

From the preceding notes it may be seen that marked differences separate the genus *Dendrochelidon* from the other Swifts, while in some points it seems to incline towards the Goatsuckers. Some of the distinctions existing between *Dendrochelidon* and the other Swifts are merely differences of degree, but others are differences of kind, so that *Dendrochelidon* not only differs from its relatives, but possesses structural characters of its own that appear quite equal to those of the rest of the Swifts combined. These differential characters are greater than those existing between the Thrushes and the Wrens, or even, I should say, between the Crows and the Swallows, so that although the material at hand is small, it is quite sufficient to warrant the formation of a new family for the members of the genus *Dendrochelidon*. The name proposed for this family is *Dendrochelidonidæ*.

The precise status of the Swifts may well be called a little uncertain, although the tendency certainly is to consider them as an order. Mr. Gill's term of super-family has been applied to the Swifts by Mr. L. Stejneger and may safely be used. Osteologically the group may be diagnosed as follows.

#### Super-family MICROPODOIDEA.

Palate ægithognathous ; maxillo-palatines unciform ; manubrium rudimentary ; xiphoid margin of sternum entire, costal process small ; coracoid short, not implanted in a groove, epi-coracoid feebly developed ; furcula widely U-shaped, hypoclidium small, epiclidium obsolete.

The two families into which this super-family is divided may be differentiated as follows.

	<i>Micropodidæ.</i>	<i>Dendrochelidonidæ.</i>
Rostral portion of cranium	broad;	moderate.
Nasals	tri-radiate, overlapping frontals;	forked, abutting against frontals.
Ecto-ethmoid	wide;	narrow.
Vomer	anteriorly much expanded, T-shaped;	scarcely expanded.
Palatines	exteriorly notched;	unnotched.
Posterior margin of sternum	convex, imperforate;	slightly concave, with two foramina.
Tarsus	longer than first digit;	shorter than first digit.
Ulna	shorter than second metacarpal;	longer than second metacarpal.
Phalanges	except ultimate and penultimate, very short or obsolete;	not shortened.

The *Micropodidæ* apparently fall into two groups according to the development of their phalanges: *Micropodinæ*.—Number of phalanges 2, 3, 3, 3. *Chaturinæ*.—Number of phalanges 2, 3, 4, 5.

It is my earnest desire, at some future day, to treat of the Swifts in greater detail, but osteological material is very difficult to procure, and at present the matter must rest. I should be very grateful for any assistance in this respect, and in closing desire to express my thanks to Mr. Adams, Dr. Baur, Dr. Mearns, Dr. W. K. Parker, and Professor Newton for their kindness in providing me with the material on which this paper is based.

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## A SUMMARY OF OBSERVATIONS ON THE BIRDS OF THE GULF COAST OF FLORIDA.

BY W. E. D. SCOTT.

(Continued from p. 379.)

**Phœnicopterus ruber.** AMERICAN FLAMINGO.—This species was of regular though rare occurrence as a summer migrant as far north as Tampa Bay. The last birds killed there were four in number, all but one immature, in the year 1885, by Mr. Stuart of Tampa.